Financial Markets' Behavior Around Episodes of Large Changes in the Fiscal Stance

Editorial Manager(tm) for European Economic Review
Manuscript Draft

Manuscript Number: EER-D-05-00050R1

Title: Financial Markets' Behavior around Episodes of Large Changes in the Fiscal Stance.

Article Type: FLA Normal Paper

Section/Category:

Keywords: Keywords: Fiscal stabilizations, fiscal expansions, interest rates, stock market prices.

Corresponding Author: Dr. Silvia Ardagna, PhD

Corresponding Author's Institution: Harvard University

First Author: Silvia Ardagna, Ph.D

Order of Authors: Silvia Ardagna, Ph.D

Manuscript Region of Origin:

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Financial Markets' Behavior around Episodes of Large Changes in the Fiscal Stance.

Silvia Ardagna[1]

Harvard University

This version: October 2006

Keywords: Fiscal stabilizations, fiscal expansions, interest rates, stock market prices. JEL: E62, E44, H62.

[1]I thank Alberto Alesina, Ignazio Angeloni, Pierluigi Balduzzi, Francesco Caselli, Jackob de Haan, Nikko Gobbin, Reinhard Neck, Paolo Paesani, Roberto Perotti, Fabio Schiantarelli, Ludger Schuknecht, Rolf Strauch, Jose Tavares, Jurgen von Hagen, two anonymous referees, and participants to a seminar at the European Central Bank Fiscal Policy Division, Instituto Superior de Economia e Gestao of Lisbon, and to the 55th International Atlantic Economic Conference for helpful discussions and comments. I am grateful to Gian Maria Milesi-Ferretti for providing data on international integration of capital markets. The usual disclaimer applies. Correspondence: Silvia Ardagna, Department of Economics, Littauer Center, Harvard University, Cambridge, MA 02138, USA. Email: sardagna@fas.harvard.edu. Phone: 1-617-495-8823. Fax: 1-617-495-7730.

Abstract

Using a panel of OECD countries from 1960 to 2002, this paper shows that interest rates, particularly those of long-term government bonds, decrease when countries' fiscal position improves and increase around periods of budget deteriorations. Stock market prices surge around times of substantial fiscal tightening and plunge in periods of very loose fiscal policy. In addition, the paper shows that results depend on countries' initial fiscal conditions and on the type of fiscal consolidations: fiscal adjustments that occur in country-years with high levels of government deficit, that are implemented by cutting government spending, and that generate a permanent and substantial decrease in government debt are associated with larger reductions in interest rates and increases in stock market prices.

1 Introduction

In the last forty years, periods of large fiscal expansions alternated with years of sharp fiscal contractions in all OECD countries. These episodes have been associated with a variety of macroeconomic outcomes and have attracted the interest of macroeconomists since the early nineties. Several papers have studied the response of private consumption, private investment and GDP growth to substantial changes in the government budget while less is known about the reaction of financial markets around episodes of large fiscal contractions and expansions.[1] Moreover, theory and empirical evidence have not yet delivered clear-cut predictions on the impact of fiscal policy shocks on interest rates and stock market prices.[2]

These considerations, together with the importance of the topic for European and US policymakers, call for additional work on the link between fiscal policy and financial variables and motivate the present paper. In particular, the goal of this paper is to investigate empirically the behavior of government and corporate bonds interest rates, of the LIBOR, and of stock market prices in times of large changes in the fiscal stance. The paper identifies periods of large fiscal contractions and expansions in a panel of OECD countries from 1960 to 2002 and it focuses on changes in interest rates and stock market prices from before to after the periods of large changes in fiscal policy.[3] By following this empirical approach, the paper answers the following

[1] See, for example, Alesina and Perotti (1997), Alesina and Ardagna (1998), Ardagna (2004a), Giavazzi and Pagano (1990), Giavazzi, Jappelli and Pagano (2000), and McDermot and Wescott (1996) for contributions on large fiscal contractions and expansions and the macroeconomy. See Balduzzi, Corsetti, and Foresi (1997) for a model on the slope of the yield-curve around periods of large fiscal contractions.

[2] An incomplete list of papers on fiscal policy and interest rates includes Ardagna, Caselli and Lane (2004), Barro (1987), Barro and Sala-i-Martin (1990), Blanchard and Summers (1984), Canzoneri, Cumby and Diba (2002), Engen and Hubbard (2004), Evans (1985) and (1987), Feldstein (1986), Hoelscher (1986), Laubach (2003), Miller and Russek (1991) and (1996), Orr et al. (1995), Paesani and Strauch (2006), Perotti (2002), Plosser (1987), Reinhart and Sack (2000), and Tavares and Valkanov (2003). See, also, Bernoth et al. (2004), and Codogno et al. (2003) for contributions on the determinants of yield differentials in EU countries, and Barth et al. (1991) and Gale and Orszag (2002) for a comprehensive review of the literature.

[3] The empirical approach is similar to the one used by Chari and Henry (2002) and by Henry (2000) and (2002) to study the effect

questions: (i) do changes in the budget deficit affect financial markets? (ii) do countries' initial levels of government deficit and public debt matter for the reaction of financial markets to fiscal shocks? (iii) does the composition of the government budget affect financial variables? (iv) what role do macroeconomic conditions and other economic policies play? (v) do financial markets react in anticipation of more/less favorable fiscal conditions in the future?

Results suggest that sharp changes in the stance of fiscal policy have the largest and most significant impact on long-term interest rates of government bonds. Interest rates of 10-year government bonds decrease, on average, by 124 basis points around episodes of fiscal consolidations and increase by 162 basis points during periods of loose fiscal policy. Fiscal consolidations and expansions also affect interest rates of 3-months Treasury bills and interest rates measuring borrowing costs for consumers and firms, but results are less robust to specifications' changes. Stock market prices increase when countries' fiscal position improves and decrease during periods of budget deteriorations. Finally, there is evidence that the effects of fiscal consolidations depend also on countries' initial fiscal position and on the nature of fiscal contractions. Fiscal adjustments that occur in country-years with high levels of government deficit, that are implemented by cutting government spending and that generate a permanent and substantial decrease in government debt are associated with larger reductions in interest rates and increases in stock market prices. Instead, around periods of fiscal expansions the interest rates of 10-year government bonds and of corporate bonds increase and stock market prices decrease regardless of countries' initial fiscal conditions.

The contribution of this paper to the existing literature goes beyond documenting the behavior of financial markets around episodes of large changes in the fiscal stance. The paper also provides additional evidence on the impact of fiscal policy shocks on financial variables by focusing not only on interest rates of governments' bonds (as most of the contributions in the literature do), but also on interest rates charged to consumers and firms and on stock market prices. Finally, this paper adds to the literature that investigates why some fiscal

of financial liberalization and disinflation programs on stock markets.

consolidations (expansions) have been associated with economic booms (recessions) even in the very short-run while others have not.

The rest of the paper is organized as follows. Section 2 presents the data and describes the methodology used to identify episodes of fiscal contractions and fiscal expansions. Section 3 investigates the relation between large fiscal contractions and expansions, interest rates and stock market prices, discusses the results and relates them to the implications of relevant theory. Section 4 extends the analysis of the benchmark models to account for countries' initial fiscal conditions, characteristics of fiscal consolidations and expansions, macroeconomic conditions, other economic policies, and future fiscal policy conditions. The last section concludes.

2 Data, methodological issues and descriptive findings

2.1 Data

The paper uses yearly data on OECD countries covering a maximum time span from 1960 to 2002. The countries included in the sample are: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Spain, Sweden, the United Kingdom, and the United States. All fiscal and macroeconomic data are from the OECD Economic Outlook no. 73, June 2003. Data on financial variables are from various sources. Interest rates of 3-month Treasury bills, of 10-year government bonds and of corporate bonds and data on LIBOR are from Global Financial Data. Data on the discount rate are from the International Financial Statistics database, while stock market data are from Morgan Stanley. Finally, Milesi-Ferretti provided data on indicators of international integration of capital markets, while data on financial development are from the World Bank database on Financial Development and Structure.[4]

[4]The database is available on line at http://www.worldbank.org/research/projects/finstructure/database.htm.

2.2 Methodological issues

This section addresses the following issues: the use of yearly data rather than of high frequency data; the choice of studying the behavior of financial variables around episodes of sharp changes in the fiscal stance rather than at the time of the announcements of the policy changes; the strategy used to identify such episodes.

In a rational world with no information asymmetries and credibility problems, financial markets should react when new information is released. One should observe movements of financial variables when governments announce fiscal stabilizations or fiscal expansions, not when they implement the policy changes if the latter had been expected. Ideally, one would like to have information on the exact announcement date and study the reaction of financial variables using high frequency data as, for example, Afonso and Strauch (2004) and Knot and de Haan (1999) do. But information on announcements of sharp fiscal policy changes are not easy to gather for a panel of sixteen countries over a period of forty years. Moreover, reliable data on fiscal variables are available only at a yearly frequency for such a large panel. For these reasons, this paper follows an alternative approach: it investigates the response of financial variables to the occurrence of fiscal contractions and fiscal expansions with yearly data, but it also includes in the sample observations from few years before to few years after the occurrence of the large decrease/increase in the government budget.

The main advantage of this approach is its feasibility. Moreover, by including data from few years before to few years after the occurrence of the large fiscal contractions/expansions (rather than only in the year of such policy changes) one allows for the possibility that the data detect the time of the shock and that financial markets anticipate the policy change and/or react to changes in the fiscal stance over time as more information becomes available. The main drawback of the use of yearly data rather than high frequency data is that the empirical analysis can potentially suffer from a measurement error problem. In fact, the connection between sharp changes in the fiscal stance and financial variables becomes weaker the further away from the announcement or from the unexpected occurrence of fiscal contractions and expansions, because of the existence of other factors in different time periods. In the attempt to show that results are not driven by

such potential problems, this paper concentrates on a window from two years before to two years after the occurrence of a fiscal contraction or expansion in the benchmark specifications.[5] Section 4, then, shows that the estimated relationships between asset prices and large changes in the fiscal stance are robust to several extensions and robustness checks including controls for other policy shocks and changes in the number of years of data used to generate the sample.

Finally, to identify episodes of fiscal contractions and expansions, I follow the recent literature on fiscal adjustments and use the same criteria as in Alesina and Perotti (1997) and Ardagna (2004a). Specifically, in the benchmark specifications, an episode of large fiscal contraction (expansion) is a period in which the cyclically adjusted primary balance improves (worsens) by at least 1.5 per cent of GDP or a period of two consecutive years in which the cyclically adjusted primary balance improves (worsens) by at least 1 per cent of GDP per year, in both years.[6] I use the primary deficit, rather than the total deficit, to avoid that episodes selected result from the effect that changes in interest rates have on government expenditures. Moreover, I cyclically adjust the primary deficit to leave aside variations of the fiscal variables induced by business cycle fluctuations.[7] Hence, episodes selected through this technique should not result from the automatic response

[5] In the case of multi-years periods of fiscal contractions or fiscal expansions, the samples include data from two years before the first year of the episode of a fiscal contraction or expansion to two years after the last year of the episode.

[6] The definition selects 92 periods of fiscal contractions and 69 years of fiscal expansions (see Ardagna (2004b) for a list of all the episodes of fiscal contractions and expansions selected by the rule). The majority of the episodes are well known in the literature and several alternative definitions of fiscal episodes select them. The inclusion of other periods in the samples, instead, is sensitive to the rule used to identify the episodes. In section 4.6, I check that results are robust to the use of alternative definitions.

[7] The cyclical adjustment is based on the method proposed by Blanchard (1993) and follows the application in Alesina and Perotti (1995). Note that there is considerable debate in the literature on which fiscal variable matters for interest rates (see, for example, Engen and Hubbard (2004)). As Gali and Perotti (2003) suggest, the choice of the fiscal policy indicator depends on the underlying model. For example, in a standard IS-LM model, changes in the government deficit determine movements of the IS curve, while the level of the deficit determines the position of the curve. General equilibrium micro-founded models, instead, emphasize the stock of public debt. While the identification of fiscal episodes relies on the change in the primary deficit, I also investigate the role played by public debt and total deficit in sections 4.1 and 4.5.

of fiscal variables to economic growth or monetary policy changes, but they should reflect discretionary policy choices of fiscal authorities.

Needless to say, there can still be an endogeneity issue related to the occurrence of fiscal contractions and expansions, because, in principle, discretionary policy choices of fiscal authorities can be affected by financial variables or countries' macroeconomic conditions (see Von Hagen and Strauch (2001) and Von Hagen, Hallett, and Strauch (2002)).[8] However, note that, for the purpose of this paper, the endogeneity problem due to the response of fiscal authorities to interest rates is likely to bias the results downward. In fact, it is plausible that policymakers respond to higher interest rates by tightening the government budget. Moreover, consider also that the budget for the current year is approved during the second half of the previous year and, even though additional measures can be taken during the course of the year, they usually become effective with some delay, generally toward the end of the fiscal year. Hence, the selection of episodes of fiscal contractions and expansions based on the rule discussed above cannot systematically result from the discretionary response of governments to changes in interest rates or stock market indicators. In conclusion, the assumption that the cyclically adjusted primary deficit does not depend on GDP or financial variables seems to be a reasonable approximation to reality and, if it induces a bias in the coefficients, most likely, such bias works to weaken the results found in the paper.

2.3 Descriptive findings

Figure 1 shows the distribution of fiscal contractions and fiscal expansions across the countries in the sample and over time. All countries experience at least one year of substantial improvement and worsening of the

[8] Von Hagen and Strauch (2001) identify episodes of fiscal consolidations on the basis of changes to the total cyclically adjusted government balance and study the effect of macroeconomic and monetary conditions on the occurrence of fiscal stabilizations. They find that economic conditions influence the probability of fiscal consolidations and their types but that the stance of monetary policy does not play a relevant role. Von Hagen, Hallett, and Strauch (2002) investigate the effect of economic conditions and of the quality of fiscal consolidations on the success of such policy reforms and find evidence along the same lines.

cyclically adjusted primary balance-to-GDP ratio. The highest percentage of fiscal contractions and fiscal expansions happen in Sweden, where fiscal policy is substantially tight and lax in 10 and 11 years respectively. Italy and the UK are also among the countries that experience more swings in fiscal policy, while Japan is in the bottom quartile of the distribution of fiscal contractions and fiscal expansions. Overall, nine countries belong to the same quartile of the distribution of fiscal contractions and fiscal expansions. Only one country, Ireland, shows a substantial higher propensity to implement fiscal contractions than fiscal expansions. During the first ten years of the sample there is relatively little action in terms of sharp changes in the fiscal stance. Episodes of fiscal expansions dominate the seventies. Periods of fiscal contractions are relatively more frequent in the eighties and nineties. In the most recent years, the stance of fiscal policy has turned into expansionary again.[9]

Figure 2 shows the average value of interest rates of 3-month Treasury bills, of 10-year government bonds and of corporate bonds, and the average value of the discount rate and LIBOR across episodes of fiscal contractions and fiscal expansions. Figure 3 focuses on the stock market. The x-axis plots time relative to the occurrence of fiscal contractions and expansions. Time T indicates the time at which changes in the fiscal stance occur. Average values of financial variables are shown from time $T-3$ (three years before the fiscal contraction/expansion period) to $T+3$ (three years after). Summary statistics of financial variables are also shown in the appendix.

The top left part of Figure 2 shows that, from $T-2$ onward, the pattern of the 10-year government bonds interest rate around the time of fiscal contractions is opposite to the one around periods of fiscal expansions: while the 10-year government bonds interest rate decreases by 111 basis points in episodes of fiscal contractions, it increases by 185 basis points in fiscal expansions. As a consequence, in $T+2$, the interest rate is higher in fiscal expansions than in fiscal contractions (8.89% versus 10.55%) even if in $T-2$ the situation

[9]Note that the trends in Figure 1 reflect changes in the discretionary part of fiscal policy. In fact, the change in the primary balance-to-GDP ratio has been cyclically adjusted.

was reversed (10% versus 8.70%).

The 3-month Treasury bills interest rate shows a similar pattern. Even though during episodes of fiscal expansions the increase in the rate is not continuous over time, from $T-2$ to $T+2$ the 3-month Treasury bills interest rate increases by 188 basis points and it decreases by 86 basis points in fiscal contractions.

Next, figure 2 plots the average value of the discount rate. Interestingly, following a sharp increase from $T-3$ to $T-2$ in fiscal expansions, the discount rate is almost identical in the two types of episodes from $T-2$ to $T+2$. From $T+2$ to $T+3$, it increases by 15 basis points in fiscal contractions and decreases by 70 basis points in fiscal expansions. Overall, and in particular from $T-2$ to $T+2$, its level and dynamics show less clear differences across fiscal episodes than the 10-year government bonds and the 3-month Treasury bills interest rates do.

The last two charts of Figure 2 plot the LIBOR and the average interest rate of corporate bonds. The LIBOR and the corporate bonds interest rate decrease from $T-2$ to $T+2$ by 167 and 56 basis points respectively during episodes of fiscal contractions and increase by 153 and 185 basis points in fiscal expansions. A more careful look at the charts also reveals that the interest rate of corporate bonds follows more closely the dynamics of the 10-year government bonds interest rates, even though period by period changes are smaller. The pattern of the LIBOR, instead, reflects more the one of the interest rates of 3-month Treasury bills, especially in fiscal consolidations.

Let's now turn to the stock market. Figure 3 shows the average of the MSCI share price index (expressed in US $ and in logs) and its growth rate. While share prices sharply increase as a fiscal adjustment approaches, they plunge in the proximity of a fiscal expansion. For example, from $T-2$ to $T+2$ the log of the MSCI share price index increases by 6.02 per cent when fiscal policy is tight and decreases by 6.36 per cent when it is lax. The rate of growth of the index is always positive and higher than the one in $T-2$ (equal to 4.71%) during fiscal contractions, but it is negative (except in $T+1$) and substantially lower than the 13.39% growth rate in $T-2$ during fiscal expansions.

In summary, a first look at the data suggests that the cost of financing the government debt and the borrowing costs for consumers and firms are correlated with the stance of fiscal policy, and that the effects seem to be anticipated and to persist over time. However, by simply looking at the charts, it is not possible to rule out other interpretations. One alternative story could be that the sharp differences in the pattern of interest rates around fiscal episodes simply reflect differences in the stance of monetary policy if the latter is systematically lax around periods of fiscal adjustments and tight around episodes of fiscal expansions. Looking at the patterns of the 3-month Treasury bills interest rate and of the LIBOR one might be tempted to believe that this story is plausible. However, the dynamics of the discount rate seems to discourage this interpretation. Moreover, the evidence that the 10-year government bonds interest rate and the corporate bonds interest rate continuously decline/increase over time (and do not reflect swings as the short-term rates do) seems to suggest that large changes in fiscal policy can at least affect long-term interest rates. The following sections explore more carefully the nature of such relation.

3 Econometric evidence

3.1 Basic specifications

I begin by investigating the relation between interest rates, stock market data and the stance of fiscal policy by regressing the nominal and the real 10-year government bonds interest rate ($INT10Y$ and $RINT10Y$, respectively), the nominal and the real 3-month Treasury bills interest rate ($INT3M$ and $RINT3M$, respectively),[10] the discount rate ($DISCR$), the LIBOR ($LIBOR$), the corporate bonds' interest rate ($CORP$), the

[10] One would like to measure $RINT10Y$ as the difference between the 10-year nominal interest rate and expectations of inflation over the next ten years. Inflation's forecasts over such a long-term time period are not available for the panel of countries used here. I follow Orr et al. (1995) and compute trend inflation using the Hodrick-Prescott filter. I apply the filter to each country's inflation rate using quarterly data (from IFS database) and a value of λ equal to 1600. I, then, take the average over each year of the trend inflation generated with quarterly data and calculate the 10-year real interest rate at a yearly frequency by subtracting the average of

log of the MSCI share price index ($MSCI$), and the MSCI share price index growth rate ($MSCIGR$) on a set of dummy variables capturing the time distance from the episodes of fiscal contractions or fiscal expansions. Specifically, I estimate:

$$Financial_{ijt} = \alpha_i + \beta_1 TIME_{ijT-1} + \beta_2 TIME_{ijT} + \beta_3 TIME_{ijT+1} + \beta_4 TIME_{ijT+2} + \varepsilon_{ijt} \qquad (1)$$

where $Financial$ is one of the variables above, $TIME_{T-j}$ are four dummy variables equal to 1 when $j = -1, 0, 1, 2$ respectively and zero otherwise, α_i captures country fixed effects, i indicates the countries in the sample, t the annual observation, and j the episode of fiscal contraction or expansion. For each episode, the samples include observations from two years before to two years after the fiscal contraction or expansion; hence $t \in [T-2, T+2]$. In equation (1), the coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ measure the change of the left-hand side variable relatively to its mean at $T-2$. I estimate (1) by OLS and correct the standard errors for heteroskedasticity.[11]

Column (1) of Table 1 shows estimates of the equation for the nominal interest rate of 10-year government bonds. The coefficients of the dummy variables $TIME_{T-j}$ are all negative in the sample of fiscal contractions and positive in the sample of fiscal expansions. The 10-year government bonds interest rate decreases in each period relatively to its value in $T-2$ around times of tight fiscal policy and it increases when governments' fiscal position worsens. The change of the interest rate gets larger as time goes by and, while β_1 and β_2 are not statistically significant, β_3 and β_4 are statistically significant at the 10% and 5% level respectively. Overall, from $T-2$ to $T+2$, $INT10Y$ falls by 124 basis points in fiscal contractions and raises by 162 basis points in fiscal expansions. These results are consistent with some recent empirical literature.[12]

trend inflation to the nominal interest rate. I also start with quarterly data to compute the real 3-month interest rate as the difference between the nominal interest rate of 3-month Treasury bills and the ex-post inflation rate. I, then, average over the year the quarterly data.

[11] As part of the sensitivity analysis, I also estimate the benchmark specifications in Tables 1 and 2 relaxing the assumption that ε_{ijt} is iid and allowing the error term to be correlated within countries or years. Results are robust.

[12] For example, Ardagna, Caselli, and Lane (2004) estimate a vector autoregressive system including the 10-year government bonds

Evidence along the same line is in column (2), where the left-hand side variable is the 3-month Treasury bills nominal interest rate. The latter varies by 103 basis points in fiscal stabilizations and by 158 basis points in fiscal expansions from $T-2$ to $T+2$. However, at no time horizon the fall in $INT3M$ is statistically significant in the sample of fiscal adjustments, while only β_4 is statistically significant at the 10% level during episodes of fiscal expansions. This result is also consistent with the existent empirical literature that does not find a robust statistically significant relationship between fiscal policy variables and short-term interest rates (see, for example, Evans (1987), and Mountford and Uhlig (2005), and Gale and Orszag (2002) for a recent review of the literature).

The results for the real interest rates of the 10-year government bonds and of the 3-month Treasury bills are similar to those for the nominal interest rates. However, the coefficients of the dummy variable $TIME_{ijT+2}$ in columns (3) and (4) are smaller, in absolute value, than in columns (1) and (2). This implies that the cumulative changes from $T-2$ to $T+2$ of $RINT10Y$ and $RINT3M$ are smaller than those of $INT10Y$ and $INT3M$.

interest rate, the 3-month Treasury bills interest rate, the inflation rate, the rate of growth of GDP, the primary deficit-to-GDP ratio and the public debt-to-GDP ratio. They find that in OECD countries a one percentage point increase in the primary deficit-to-GDP ratio leads to an increase of the 10-year government bonds interest rate of 7 basis points on impact, and to a cumulative increase of 66 basis points after five years. On average, from $T-2$ to $T+2$, the cyclically adjusted primary balance-to-GDP ratio improves by 2 percentage points in the sample of fiscal contractions and worsens by 3 percentage points in fiscal expansions. Using estimates from the VAR specification in Ardagna, Caselli, and Lane (2004), one predicts a decrease of the 10-year government bonds interest rate by 132 basis points over a five year window in fiscal contractions, and an increase by 198 basis points in fiscal expansions. These numbers are quite close in magnitude to the changes in $INT10Y$ from $T-2$ to $T+2$ predicted in column (1) of Table 1 (i.e. -124 basis points in fiscal contractions and 166 basis points in fiscal expansions). Note, however, that estimates are only roughly comparable because of the different types of experiments conducted in the papers. Ardagna, Caselli and Lane (2004) study the effect of an unanticipated one period shock to the government primary deficit. In column (1) of Table 1, the coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ measure the change of the left-hand side variable relatively to its mean at $T-2$ and from $T-2$ to $T+2$ the government deficit-to-GDP ratio continuously changes.

Lets' now turn to results in columns (5)-(7). The coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ are never statistically significant when equation (1) is estimated for the discount rate (column (5)). Moreover, data do not show a clear decreasing or increasing pattern as in the case of interest rates on public debt, especially in the sample of fiscal expansions. Either the $LIBOR$ or the average interest rate of corporate bonds are, instead, significantly different (at least at the 10% level) at T, $T+1$ and $T+2$ from their values at $T-2$ either in the sample of fiscal contractions or in the one of fiscal expansions.

Finally, the last two columns of Table 1 investigate the behavior of stock markets. The evidence is consistent with the one for interest rates. The MSCI share price index and its growth rate increase around episodes of fiscal contractions and fall around periods of fiscal expansions. For example, in times of fiscal expansions, the average growth rate of the MSCI share price index is 12.6% at $T-2$, and it decreases by about 16%, 18%, 10% and 14% in $T-1$, T, $T+1$ and $T+2$. Note, however, that the coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ are statistically significant in the specification for the MSCI share price index only in the sample of fiscal contractions. In fiscal expansions, $\beta_1, \beta_2, \beta_3, \beta_4$ are significant only for the specification for the growth rate of the share price index.

3.2 A reparametrization of the basic specifications

The absolute values of the coefficients of the dummy variables $TIME_{T-j}$ seem to decrease or increase continuously from $T-2$ to $T+2$ for the regressions of all financial variables with statistically significant coefficients. To better capture this evidence, Table 2 estimates a reparametrized version of equation (1):

$$Financial_{ijt} = \alpha_i + \gamma\, FISCAL_{ijt} + \varepsilon_{ijt} \tag{2}$$

where $FISCAL$ is equal to 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after. This specification has the advantage of being more compact and more convenient when estimating the regressions in the following sections that include more variables on the right-hand side of equation (2). However, it constraints the change

of the left-hand side variable to be of the same magnitude from one period to the next.

As expected from the results in Table 1, the coefficient of $FISCAL$ is negative in fiscal contractions and positive (except for the regression of $DISCR$) in fiscal expansions when I investigate the reaction of interest rates to changes in the fiscal stance. It is positive in fiscal contractions and negative in fiscal expansions when the share price index or its growth rate are on the left-hand side of (2) (see Table 2, Part I).[13]

In Part II of Table 2, I introduce among the regressors the value of the left-hand side variable at $T-2$. This checks that the opposite behavior of interest rates and stock market prices observed around episodes of fiscal contractions and expansions is not due to differences in the initial levels of the left-hand side variables. Figures 2 and 3 show, in fact, that interest rates are higher and stock market prices are lower before the occurrence of a fiscal contraction than before a fiscal expansion. However, controlling for the initial values of the left-hand side variables does not alter the nature of the results discussed so far. In the sample of fiscal contractions results are even stronger than in Part I of Table II.

In summary, estimates in Tables 1 and 2 support the evidence in Figures 2 and 3 and show that there is a negative (positive) correlation between changes in governments' primary balance and interest rates (stock markets data). This is not due to time-invariant country specific characteristics or to differences in the initial values of interest rates and stock market prices around episodes of fiscal contractions and fiscal expansions. Before checking that conclusions reached so far hold when I include additional variables on the right-hand side of equation (2), the next section relates the evidence shown to some relevant theory.

3.3 Discussion

There are several channels through which fiscal shocks can be transmitted to the macroeconomy via financial markets. While testing the validity of different theoretical models is beyond the scope of this work (and so is an exhaustive summary of the theoretical literature), in this section I review very briefly the predictions of

[13] See section 4.6 for specifications that also control for time effects.

some relevant theory to offer a possible interpretation of the results presented so far.

In a standard IS-LM model, expansionary fiscal policies lead to a ceteris paribus increase in aggregate demand and short-term interest rates while the effect on long-term interest rates depends also on the expectation of the future fiscal policy stance. Because financial markets are forward looking, both current and expected future short-term interest rates matter. As an example, assume that the current deficit increases and expectations of future deficits are also higher, then both current and future short-term interest rates increase, leading to higher long-term interest rates in the current period.

Two arguments go against this view. First, if economies are open and there is perfect capital mobility among countries, the real interest rate in each country depends only on the aggregate stance of fiscal policy. In fact, a decrease in national saving due to the increase in government deficit will be financed by capital inflows from abroad. This eliminates the pressure on domestic interest rates. Second, if Ricardian equivalence holds, consumers anticipate that taxes will increase in the future because governments have to pay back the debt issued to finance the deficit increase. Private consumption does not change, but private saving increases and compensates for the decrease in government saving. As a consequence, real interest rates do not change.

Finally, agents' perception about the impact of current fiscal policy on the sustainability of government debt can also be important to explain the effect of fiscal shocks on financial variables. The so-called "expectation view", elaborated to explain why some, but not all, fiscal adjustments have expansionary effects on the economy, predicts that fiscal stabilizations may be expansionary if agents believe that the fiscal tightening generates a change in regime that "eliminates the need for larger, maybe much more disruptive adjustments in the future" (Blanchard (1990)). Suppose, for example, that agents think that a stabilization in the current period is credible and avoids a default on government debt, they can ask for a lower premium on government bonds. Private demand components sensitive to the real interest rate can increase if the reduction in the interest rate paid on government bonds leads to a reduction in the real interest rate charged to consumers and firms. The decrease in interest rate can also lead to the appreciation of stocks and bonds, increasing agents'

financial wealth, and triggering a consumption/investment boom. Moreover, if agents have quite a substantial share of their wealth in government bonds, they can be willing to consume and invest more also because the adjustment removes the uncertainty about the "availability" of this part of their wealth.

Based on the empirical evidence presented in the previous sections, the size and the significance of the estimated coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ in (1) or of γ in (2) predict a positive (negative) correlation between interest rates (stock market indicators) and fiscal policy shocks. Sharp changes in the stance of fiscal policy have the largest and most significant impact on long-term interest rates of government bonds, but, fiscal consolidations and expansions also affect interest rates measuring borrowing costs for consumers and firms and stock market prices. This evidence is interesting and it is consistent with theoretical models such as a standard IS-LM model, models of risk premium, or with the so-called "expectation view". From the empirical analysis conducted in this paper, it is not possible to discriminate among these different theoretical models. However, to provide more evidence on the channels and circumstances through which large changes in the primary balance affect interest rates and stock markets indicators, in the next section, I also investigate whether the response of financial variables to fiscal shocks depends on the different types of fiscal contractions or expansions (e.g.: credible versus non credible changes in the fiscal stance; fiscal contractions/expansions based on expenditure cuts versus tax changes).

4 Extensions and robustness

Results shown are robust to a variety of specification changes. In what follows, I extend the analysis in section 3 to account for countries' initial fiscal conditions, characteristics of fiscal consolidations and expansions, macroeconomic conditions, other economic policies, and future fiscal policy conditions. I, then, summarize the results of additional robustness checks. For brevity sake, in this section, I present only tables for the sample of fiscal contractions. Tables for the sample of fiscal expansions are available upon request and are also shown in the working paper version of this paper.

4.1 Countries' fiscal position

The response of financial markets to fiscal contractions and expansions can be different in countries with low/high levels of government deficit or public debt. In fact, markets can react only when they perceive that the change in fiscal policy affects the likelihood of a default crisis, which, very likely, is correlated with the level of the deficit or with the stock of public debt. To investigate this possibility, I include among the right-hand side variables of equation (2) the value of the government deficit-to-GDP ratio (DEF) or of the public debt-to-GDP ratio ($DEBT$) at time $T-2$ alone, or together with an interaction term between DEF or $DEBT$ and the variable $FISCAL$.

Controlling for countries' initial fiscal position does not alter in any relevant way the size and the statistical significance of the coefficient of $FISCAL$ relatively to the estimates in Table 2 (see Part I of Table 3).[14] Instead, I find an asymmetry between episodes of fiscal contractions and expansions when I also include the interaction term between DEF or $DEBT$ and the variable $FISCAL$ on the right-hand side of (2). In the sample of fiscal expansions, the coefficients of the interaction terms $FISCAL*DEF$ and $FISCAL*DEBT$ are not statistically significant at conventional critical values. This suggests that the effect of fiscal expansions on financial variables does not depend on countries' initial fiscal conditions. Hence, the econometric specifications estimated so far well capture the response of financial variables around periods of large budget deteriorations. Instead, initial conditions seem to matter for the response of financial markets to fiscal shocks in episodes of fiscal contractions. In fact, the coefficient of $FISCAL$ looses significance in almost all regressions, but the coefficients of $FISCAL*DEF$ and $FISCAL*DEBT$ are statistically significant at least in one of the two specifications and for the regressions of all variables except $DISCR$ (see Table 3, Part II). Hence, the decrease in interest rates and the increase in stock market prices are larger the higher the initial

[14] Note that the coefficient of $DEBT$ is negative and statistically significant in the regressions for interest rates and positive in those for stock market prices. Ardagna, Caselli and Lane (2004) and Caporale and Williams (2002) find the same result and explain it as consequence of a liquidity effect.

levels of government deficit and/or public debt.

4.2 Composition of fiscal manoeuvre

Alesina and Perotti (1997), Ardagna (2004a), McDermott and Wescott (1996), among others, suggest that the credibility of a fiscal consolidation depends also on its composition. Fiscal contractions that are achieved by cutting public spending more than by increasing tax rates are more likely to be long-lasting. Governments that reduce transfers, government wages, public employment are perceived to be committed to solve the fiscal imbalance, because they undertake policy measures with more permanent effects on the budget. Moreover, Alesina et al. (2002) show that profits increase in response to cuts of government spending, but decrease when taxes increase. Following these arguments, I checked if financial markets react differently to fiscal contractions (expansions) that sharply decrease (increase) government spending by estimating three alternative specifications of equation (2). Results are in Table 4.

First, I introduce among the regressors of equation (2), the change of the cyclically adjusted primary expenditure-to-GDP ratio ($\Delta PREXP$) or the change of the ratio of cyclically adjusted transfers and government wage payments-to-GDP ($\Delta(TRANSF + CGW)$). Second, I define the following dummy variables: (i) $EXPLOW1$ equal to 1 if the decrease (increase) of the cyclically adjusted primary expenditure-to-GDP ratio is larger (smaller) than the median change in the sample of fiscal contractions (fiscal expansions) and zero otherwise; (ii) $EXPHIGH1$ equal to $1 - EXPLOW1$; (iii) $EXPLOW2$ equal to 1 if the decrease (increase) of the ratio of cyclically adjusted transfers and government wage payments-to-GDP is larger (smaller) than the median change in the sample of fiscal contractions (fiscal expansions) and zero otherwise; (iv) $EXPHIGH2$ equal to $1 - EXPLOW2$. I introduce among the regressors of equation (2) $EXPLOW1$ or $EXPLOW2$ in the sample of fiscal contractions and $EXPHIGH1$ or $EXPHIGH2$ when I estimate the specifications for the sample of fiscal expansions. Third, I estimate equation (2) not only adding among the regressors the dummy variables, but also interacting them with the variable $FISCAL$.

Let's begin by discussing the estimates in Part I and II of Table 4. First, the qualitative nature of the results shown so far holds. In fact, the coefficient of $FISCAL$ is close to the one in Table 2. Second, when the estimated coefficients are statistically significant, I find a positive correlation between changes in government spending and interest rates and a negative correlation between $\Delta PREXP$ or $\Delta(TRANSF + CGW)$ and $MSCI$ or $MSCIGR$. Hence, sharper cuts to primary spending and to transfers and governments' wage bills are associated with lower interest rates and higher stock markets prices. Third, Part II suggests that changes in transfers and the governments' wage bills have a larger effect on financial variables than changes in the overall primary spending. These conclusions are also confirmed in the sample of fiscal expansions.

More evidence along the same lines is in Part III of Table 4. Consider, for example, results in column 1 for the specification that includes the dummy variable $EXPLOW2$. The 10-year nominal interest rate of government bonds decreases, on average, in each period, by 55 basis points, for a total decrease, from $T-2$ to $T+2$, of about 220 basis points if the dummy variable $EXPLOW2$ is equal to 1. $INT10Y$, instead, falls only by 19 basis points per period, and by a total of 76 basis points, if transfers and the government wage bill change by less than the median value in the sample. Also, while the t-statistics of the coefficient of $FISCAL * EXPLOW2$ is equal to -2.54, the one of $FISCAL * EXPHIGH2$ is equal to 1.19.

4.3 Macroeconomic conditions

This section investigates the role played by macroeconomic conditions. I introduce on the right-hand side of equation (2) the growth rate of real GDP ($GROWTH$), or of the output gap, and the inflation rate ($INFL$) at $T-2$ and their yearly change to control for the initial macroeconomic conditions and for the changes in the macroeconomic fundamentals that happen from $T-2$ to $T+2$. Results for the specifications that include the variable $GROWTH$ are shown in Table 5; results for the specifications with the output gap are available upon request.

In Table 5, the coefficients of $FISCAL$ are close in size to the values in Table 2. In the sample of fiscal

contractions, the coefficient of $FISCAL$ becomes statistically significant at the 5% level in the regression for $INT3M$, and at the 10% level in the regression for $CORP$, while it was insignificant in Table 2. However, in the sample of fiscal expansions, the coefficient of $FISCAL$ becomes insignificant in the regressions for $RINT3M$ and $MSCI$, while it was significant at the 10% level in Table 2. Finally, when I substitute the variable $GROWTH$ with the output gap the coefficients of $FISCAL$ and their significance are very close to the ones in Table 5.

4.4 The policy mix

An alternative explanation for the decrease (increase) of interest rates and increase (decrease) of stock market prices around episodes of fiscal contractions (expansions) is that governments implement these changes in fiscal policy with other economic measures that move financial variables in the observed directions, and, hence, the coefficient of $FISCAL$ would not capture the effect of the large changes in the fiscal stance but the effect of omitted variables. To address this concern, I estimate equation (2) by adding among the regressors variables that capture the stance of monetary policy, the extent of financial liberalization, international financial integration, and exchange rate movements.

First, I estimate equation (2) for $INT10Y$, $RINT10Y$, $LIBOR$, $CORP$, $MSCI$, $MSCIGR$ by including among the regressors the initial values of the discount rate, of the 3-month Treasury bills interest rate, and their yearly change to control for monetary policy.[15] Results are very similar to those in Table 2 (see Table 6). Hence, the evidence shown so far is not due to omitting variables measuring the stance of monetary policy.[16] It is also interesting to note that the coefficients of $FISCAL$ in the regressions for $MSCI$ or

[15] Data availability and comparability across countries constraints the choice of the indicators of the monetary policy stance. Following the suggestion of one of the referees, I have also estimated equation (2) by including among the regressors the initial value of M2 and its yearly change to control for the stance of monetary policy. Results not shown but available upon request are robust to this specification change.

[16] This result should come at no surprise since the coefficient of $FISCAL$ is never statistically significant in the discount rate

$MSCIGR$ are still positive (negative) in fiscal contractions (expansions) when controlling for the discount rate or the 3-month Treasury bills interest rate. This seems to suggest that fiscal discipline has an effect on the stock market beyond the effect that it has on interest rates. For example, the stock market can react in view of higher profitability. Both current and expected lower taxes or lower public spending can, in fact, boost profits.[17]

Second, I include on the right-hand side of (2) the initial values of the growth of the nominal effective exchange rate ($EXCHGR$), a measure of the extent of international integration of capital markets ($INT.INTEGR$), a measure of financial liberalization ($FIN.LIB$), and the yearly change of these three variables. The variable $INT.INTEGR$ is an index constructed with data provided by Milesi-Ferretti and following Lane and Milesi-Ferretti (2003). Specifically, $INT.INTEGR$ is a variable ranging from 0 to 4 and increasing in the degree of restrictions to the international integration of capital markets. It is available for all countries in the sample from 1966 to 1997 and it is equal to the sum of different dummy variables measuring the existence of restrictions on the capital account, on the current account and the existence of multiple exchange rates. The variable $FIN.LIB$ is by Levine et al. (2000). It is equal to the ratio of commercial banks assets divided by commercial bank plus central bank assets. A higher value of this ratio implies a greater degree of financial liberalization.

Results in Table 7 suggest that restrictions on the current and capital accounts lead to higher interest rates and that reforms that liberalize financial markets have the opposite effect. The coefficient of the growth of the nominal exchange rate has, instead, opposite sign in the samples of fiscal contractions and fiscal expansions, giving an ambiguous picture on the effect of devaluations/appreciations of the exchange rate.[18] More importantly, the size and the significance of the coefficients of $FISCAL$ are very close to their values in Table 2 in the sample of fiscal contractions. However, results are weaker when I concentrate on the sample of fiscal

equation and it is often insignificant in the $INT3M$ equation.

[17] See Alesina et al. (2002) on the effect of government spending and taxation on profits.

[18] A minus sign of the coefficient of $EXCHGR$ indicates a nominal devaluation.

expansions. Most likely, this is due to the loss of degree of freedom since the number of observations drops almost by half relatively to the one in Table 2.

4.5 Do financial markets react in anticipation of improved government debt's sustainability?

Consider a credible fiscal contraction, that is one in which agents believe that the government is able to generate a persistent decrease in public debt. As Alesina et al. (1992) show, in a model with two equilibria, a credible fiscal adjustment can move the economy from a "bad" equilibrium to a "good" one. In the bad equilibrium, public debt is increasing and the default risk is rational since investors demand a risk premium. Interest rates on government bonds increase making default more likely. In the good equilibrium, instead, public debt falls, the risk premium decreases, interest rates are low and investors' confidence in governments' ability to honor debt is rational. Hence, a fiscal adjustment that moves the economy from the bad to the good equilibrium can generate a sharp decrease in interest rates. Similarly, a fiscal expansion that is perceived to be long lasting with dramatic effects on the stock of public debt can generate a strong increase in interest rates. In what follows, I look at the path of public debt few years after the episodes of large changes in the fiscal stance and provide some evidence in favor of Alesina et al. (1992).

First, I introduce among the regressors of equation (2) the change of the public debt-to-GDP ratio from the last year of the fiscal contraction or fiscal expansion to two ($\Delta DEBT_{T+2}$) or three ($\Delta DEBT_{T+3}$) years after. Second, I separate episodes using the criteria in McDermott and Wescott (1996) or in Alesina and Perotti (1995). Specifically, I define the following dummy variables: (i) $DEBTLOW1$ equal to 1 if, two years after the last year of the fiscal contraction (fiscal expansion), the ratio of public debt-to-GDP has declined (increased) more (less) than 3 percentage points and zero otherwise; (ii) $DEBTHIGH1$ equal to $1-DEBTLOW1$; (iii) $DEBTLOW2$ equal to 1 if, three years after the last year of the fiscal contraction (fiscal expansion), the ratio of public debt-to-GDP has declined (increased) more (less) than 5 percentage points and zero otherwise; (iv) $DEBTHIGH2$ equal to $1 - DEBTLOW2$. I introduce among the regressors of

equation (2) $DEBTLOW1$ or $DEBTLOW2$ in Part II of Table 7 (and $DEBTHIGH1$ or $DEBTHIGH2$ when I estimate the specifications for the sample of fiscal expansions). Third, I estimate equation (2) not only adding the dummy variables, but also interacting them with the variable $FISCAL$.

Overall, results support the theoretical prediction by Alesina et al. (1992) in the panel of fiscal contractions (Table 8), but evidence is murkier in the panel of fiscal expansions. Financial markets seem to react in anticipation of the future path of government debt-to-GDP ratio: the higher the decline in public debt after fiscal contractions, the lower the interest rates and the higher the stock market price index and its growth rate. For example, a decline of the public debt-to-GDP ratio by one percentage point is associated with an additional decrease of the 10-year government bonds interest rate of about 16 basis points (see Table 8, Part I). Interestingly, when I investigate if the effect of large changes of the government budget on financial variables depends on the decrease of public debt in the future, I find that interest rates decrease and that the stock market reacts positively only when governments are successful in reducing the debt-to-GDP ratio. In fact, in Table 8, Part III, the coefficients of $FISCAL * DEBTLOW1$ and $FISCAL * DEBTLOW2$ are statistically significant, but the coefficients of $FISCAL * DEBTHIGH1$ and $FISCAL * DEBTHIGH2$ are not. However, this evidence is not confirmed in the sample of fiscal expansions.

4.6 Additional robustness checks

This section summarizes the results of additional robustness checks. Results are not shown and are available upon request. First, I estimate equation (2) controlling for the time dimension. Figure 1 shows that the distribution of fiscal contractions and expansions over time is not uniform. Fiscal expansions are more frequent in the seventies and in the last years of the sample, while fiscal contractions are more common in the eighties and nineties. Following this evidence, I define five dummy variables respectively equal to 1 in 1960-1969, 1970-1979, 1980-1989, 1990-1999, 2000-2002 and zero otherwise. I include them on the right-hand side of (2). Results show that the size and significance of the coefficient of $FISCAL$ are not unduly sensitive to this

specification change. In the sample of fiscal contractions, the coefficient of $FISCAL$ in the regression of $RINT10Y$ is not significant and the one of $LIBOR$ is significant only at the 10% level. In the sample of fiscal expansions, results are even stronger than the ones in Table 2.

Second, I estimate equation (2) using two alternative criteria to select episodes of fiscal contractions and expansions. Specifically, episodes of large fiscal contractions (expansions) are defined as: (i) periods in which the cyclically adjusted primary balance improves (worsens) by at least 1 per cent of GDP per year; (ii) periods in which the cyclically adjusted primary balance improves (worsens) by at least 1.5 per cent of GDP per year. The first less demanding rule identifies 118 years of fiscal contractions and 97 periods of fiscal expansions, while there are 65 periods of fiscal contractions and 55 episodes of fiscal expansions according to definition (ii). When (i) is used, results are very close to those in Table 2 even though the size of the coefficients is slightly smaller. When the tighter definition is used changes in the stance of fiscal policy have larger effects on financial variables in periods of fiscal contractions. In the sample of fiscal expansions, however, the size of the coefficients is, in general, smaller and the coefficients of $INT10Y$ and $RINT10Y$ are not statistically significant.

Third, results are not sensitive to a particular country in the sample, In fact, dropping one country at a time does not alter the estimates of equation (2).

Fourth, I check if results are sensitive to including in the samples a different number of years before or after the occurrence of fiscal contractions/expansions. The qualitative nature of the results does not change if I extend the window and include three periods before and after the occurrence of a fiscal contraction/expansion, or if I include observations from $T-2$ to $T+1$. Instead, if I include in the samples only observations starting from $T-1$, the coefficient of $FISCAL$ looses significance in many regressions. However, its sign is

consistent with results in Table 2.[19]

Finally, I include among the regressors of equation (2) most of the variables that have been separately added in sections 4.1-4.5. In particular, I estimate equation (2) controlling for: (i) countries' initial fiscal position by including the value of the government deficit-to-GDP ratio (DEF), (ii) the composition of the fiscal consolidation/expansion by adding the change of the ratio of cyclically adjusted transfers and government wage payments-to-GDP ($\Delta(TRANSF + CGW)$), (iii) the macroeconomic situation by adding all the variables in Table 6, (iv) the policy-mix by including all the variables in Table 7, (v) the change of the public debt-to-GDP ratio from the last year of the fiscal contraction or fiscal expansion to three years after ($\Delta DEBT_{T+3}$). Despite the sharp decrease in the number of observations and in the degrees of freedom, the coefficient of $FISCAL$ in the sample of fiscal contractions remains negative (positive) and statistically significant as in Table 2 when I estimate regressions for interest rates ($MSCI$ index and its growth rate). The size of the coefficients is also larger than in the benchmark model. In the sample of fiscal expansions, results are once again less strong.

5 Conclusions

This paper concentrates on episodes of large fiscal consolidations and expansions occurred in OECD countries from 1960 to 2002 and shows that interest rates fall and stock market prices increase around episodes of fiscal consolidations; the opposite occurs around periods of fiscal expansions. In addition, the paper suggests that financial markets' response to large changes in the fiscal stance depends on countries' initial fiscal positions and on the nature of fiscal contractions. Fiscal adjustments that occur in country-years with high levels of government deficit, that are implemented by cutting government spending, and that generate a permanent and

[19] I interpret this as evidence that financial markets anticipate the occurrence of fiscal contractions and expansions. Hence, including in the samples only observations starting from one year before does not allow us to fully capture the effect of the large swings in fiscal policy on financial variables.

substantial decrease in government debt are associated with larger reductions in interest rates and increases in stock market prices. In the sample of fiscal contractions, results are robust to controlling for inflation, GDP growth and indicators of monetary and financial liberalization policies. In the sample of fiscal expansions, results are somewhat less robust to specification changes.

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Table 1: Financial markets, fiscal contractions and fiscal expansions

	INT10Y	INT3M	RINT10Y	RINT3M	DISCR	LIBOR	CORP	MSCI	MSCIGR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Fiscal Contractions				
$\mathbf{TIME_{T-1}}$	-0.0029	-0.0049	-0.0022	-0.0040	-0.0002	-0.0118	-0.0035	0.0705	0.0234
	(-0.48)	(-0.66)	(-0.44)	(-0.65)	(-0.04)	(-1.50)	(-0.57)	(0.43)	(0.57)
$\mathbf{TIME_{T}}$	-0.0082	-0.0078	-0.0054	-0.0046	-0.0057	-0.0144	-0.0068	0.2751	0.0878
	(-1.61)	(-1.21)	(-1.29)	(-0.85)	(-0.97)	(-2.10)**	(-1.23)	(1.95)*	(2.66)**
$\mathbf{TIME_{T+1}}$	-0.0106	-0.0085	-0.0082	-0.0047	-0.0041	-0.0143	-0.0058	0.3571	0.0443
	(-1.74)*	(-1.15)	(-1.64)*	(-0.74)	(-0.59)	(-1.81)*	(-0.89)	(2.23)**	(1.16)
$\mathbf{TIME_{T+2}}$	-0.0124	-0.0103	-0.0097	-0.0076	0.0016	-0.0194	-0.0063	0.4172	0.0323
	(-2.05)**	(-1.38)	(-1.94)*	(-1.20)	(0.23)	(-2.43)**	(-0.94)	(2.61)**	(0.79)
Constant	0.1213	0.1145	0.1034	0.0960	0.1197	0.1130	0.1181	4.7753	0.0274
	(17.10)**	(11.03)**	(16.53)**	(10.86)**	(11.32)**	(6.95)**	(13.92)**	(29.83)**	(0.58)
N. of obs.	306	287	306	287	257	268	245	289	285
$\mathbf{R^2}$	0.34	0.36	0.32	0.37	0.44	0.40	0.34	0.44	0.10
					Fiscal Expansions				
$\mathbf{TIME_{T-1}}$	0.0057	0.0124	0.0051	0.0106	0.0029	0.0154	0.0086	-0.0251	-0.1576
	(0.86)	(1.54)	(0.95)	(1.58)	(0.34)	(1.56)	(1.33)	(-0.12)	(-3.36)**
$\mathbf{TIME_{T}}$	0.0089	0.0088	0.0084	0.0112	-0.0036	0.0056	0.0140	-0.1048	-0.1796
	(1.40)	(1.23)	(1.59)	(1.84)*	(-0.44)	(0.66)	(2.20)**	(-0.54)	(-4.22)**
$\mathbf{TIME_{T+1}}$	0.0122	0.0111	0.0102	0.0096	0.0021	0.0105	0.0146	-0.2614	-0.0974
	(1.67)*	(1.30)	(1.68)*	(1.39)	(-0.23)	(0.93)	(1.83)*	(-1.21)	(-1.93)*
$\mathbf{TIME_{T+2}}$	0.0162	0.0158	0.0142	0.0143	-0.0017	0.0110	0.0165	-0.3364	-0.1405
	(2.37)**	(1.92)*	(2.47)**	(2.09)**	(-0.21)	(1.15)	(2.12)**	(-1.59)	(-2.93)**
Constant	0.0923	0.0807	0.0755	0.0617	0.0997	0.0944	0.0919	5.0529	0.1258
	(11.79)**	(6.80)**	(9.24)**	(5.09)**	(8.11)**	(5.18)**	(9.57)**	(21.69)**	(2.62)**
N. of obs.	226	213	226	213	196	185	184	223	220
$\mathbf{R^2}$	0.29	0.30	0.29	0.34	0.31	0.27	0.28	0.40	0.14

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; $TIME_{T-j}$ are four dummy variables equal to 1 when j=-1,0,1,2 respectively and zero otherwise. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Table 2: Financial markets, fiscal contractions and fiscal expansions

PART I	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Fiscal Contractions				
FISCAL	-0.0033	-0.0024	-0.0025	-0.0016	-0.0002	-0.0041	-0.0015	0.1119	0.0084
	(-2.40)**	(-1.44)	(-2.27)**	(-1.11)	(-0.12)	(-2.33)**	(-1.03)	(3.15)**	(0.91)
Constant	0.1240	0.1151	0.1059	0.0964	0.1177	0.1131	0.1178	4.6722	0.0481
	(17.36)**	(11.08)**	(16.72)**	(10.80)**	(10.97)**	(6.91)**	(13.95)**	(29.16)**	(0.93)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.34	0.36	0.32	0.37	0.44	0.40	0.33	0.44	0.08
					Fiscal Expansions				
FISCAL	0.0039	0.0030	0.0034	0.0028	-0.0004	0.0017	0.0040	-0.0894	-0.0234
	(2.51)**	(1.64)*	(2.60)**	(1.82)*	(-0.24)	(0.77)	(2.31)**	(-1.89)*	(-2.10)**
Constant	0.0893	0.0810	0.0731	0.0626	0.1004	0.0970	0.0911	5.1824	0.0702
	(11.10)**	(6.38)**	(8.60)**	(4.83)**	(8.06)**	(5.12)**	(9.00)**	(22.43)**	(1.38)
N. of obs.	226	213	226	213	196	185	184	223	220
R^2	0.29	0.29	0.29	0.33	0.31	0.26	0.27	0.40	0.07
PART II	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Fiscal Contractions				
FISCAL	-0.0035	-0.0030	-0.0027	-0.0020	-0.0010	-0.0046	-0.0026	0.1315	0.0090
	(-4.00)**	(-2.78)**	(-3.47)**	(-2.14)**	(-0.87)	(-3.72)**	(-2.52)**	(7.77)**	(0.97)
Constant	0.0326	0.0410	0.0341	0.0330	0.0327	0.0281	0.0413	0.3438	0.0505
	(4.62)**	(5.11)**	(4.74)**	(4.61)**	(3.69)**	(3.53)**	(5.01)**	(2.20)**	(0.99)
N. of obs.	306	278	306	278	257	261	241	277	277
R^2	0.72	0.75	0.66	0.71	0.72	0.70	0.66	0.89	0.09
					Fiscal Expansions				
FISCAL	0.0019	0.0008	0.0020	0.0015	-0.0009	-0.0024	0.0027	0.0056	-0.0267
	(1.96)**	(0.59)	(2.31)**	(1.24)	(-0.69)	(-1.36)	(2.11)**	(0.37)	(-2.46)**
Constant	-0.0004	-0.0054	0.0055	-0.0010	0.0229	-0.0111	0.0113	0.0630	0.0747
	(-0.05)	(-0.44)	(0.75)	(-0.09)	(1.81)*	(-0.57)	(0.84)	(0.43)	(1.48)
N. of obs.	223	211	223	211	196	175	184	223	205
R^2	0.76	0.70	0.70	0.67	0.61	0.66	0.58	0.95	0.10

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Table 3: The role of countries' initial fiscal position in periods of fiscal contractions

PART I	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0031	-0.0018	-0.0024	-0.0011	0.0001	-0.0036	-0.0015	0.1116	0.0117
	(-2.31)**	(-1.15)	(-2.22)**	(-0.81)	(0.08)	(-2.08)**	(-1.04)	(3.11)**	(1.28)
DEF_{T-2}	0.2401	0.3884	0.2796	0.3961	0.1862	0.1989	0.0324	5.2456	1.2250
	(3.36)**	(5.08)**	(5.10)**	(6.63)**	(2.22)**	(2.25)**	(0.33)	(2.52)**	(2.80)**
Constant	0.1111	0.0933	0.0910	0.0745	0.1072	0.1003	0.1162	4.4030	-0.0248
	(13.85)**	(8.44)**	(13.17)**	(7.91)**	(9.31)**	(5.80)**	(11.60)**	(23.25)**	(-0.43)
N. of obs.	301	282	301	282	252	263	245	284	280
R^2	0.36	0.40	0.37	0.42	0.43	0.39	0.34	0.45	0.11
FISCAL	-0.0038	-0.0026	-0.0030	-0.0017	-0.0006	-0.0041	-0.0028	0.1285	0.0151
	(-2.80)**	(-1.58)	(-2.64)**	(-1.18)	(-0.38)	(-2.63)**	(-1.91)*	(4.22)**	(1.57)
$DEBT_{T-2}$	-0.0594	-0.0476	-0.0401	-0.0283	-0.0426	-0.1031	-0.0534	2.9165	0.0373
	(-4.93)**	(-3.06)**	(-4.10)**	(-2.23)**	(-2.79)**	(-8.30)**	(-4.25)**	(13.82)**	(0.46)
Constant	0.1116	0.0823	0.0993	0.0693	0.0724	0.1012	0.0922	4.5082	0.0190
	(16.74)**	(9.58)**	(16.82)**	(9.33)**	(11.08)**	(11.58)**	(12.79)**	(42.67)**	(0.39)
N. of obs.	265	254	265	254	216	239	226	248	244
R^2	0.40	0.38	0.35	0.35	0.47	0.55	0.43	0.68	0.11

PART II	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0002	0.0008	-0.0008	0.0001	0.0025	-0.0012	0.0029	0.0589	-0.0072
	(-0.10)	(0.34)	(-0.48)	(0.07)	(1.14)	(-0.45)	(1.68)*	(0.98)	(-0.50)
FISCAL*DEF_{T-2}	-0.0634	-0.0558	-0.0357	-0.0256	-0.0494	-0.0519	-0.0937	1.2106	0.4339
	(-1.67)*	(-1.41)	(-1.18)	(-0.80)	(-1.34)	(-1.08)	(-2.44)**	(1.22)	(1.69)*
DEF_{T-2}	0.4297	0.5596	0.3864	0.4747	0.3272	0.3569	0.3084	1.5343	-0.1082
	(3.41)**	(4.05)**	(3.97)**	(4.29)**	(2.51)**	(2.14)**	(2.29)**	(0.41)	(-0.12)
Constant	0.1026	0.0853	0.0862	0.0708	0.1005	0.0929	0.1032	4.5653	0.0336
	(11.44)**	(6.96)**	(11.44)**	(6.77)**	(8.21)**	(5.10)**	(10.69)**	(18.90)**	(0.50)
N. of obs.	301	282	301	282	252	263	245	284	280
R^2	0.37	0.40	0.38	0.42	0.44	0.40	0.35	0.46	0.12
FISCAL	0.0005	0.0040	0.0009	0.0047	0.0023	0.0021	0.0017	0.1217	0.0397
	(0.16)	(1.10)	(0.36)	(1.50)	(0.67)	(0.61)	(0.53)	(1.84)*	(1.83)*
FISCAL*$DEBT_{T-2}$	-0.0071	-0.0109	-0.0066	-0.0105	-0.0050	-0.0098	-0.0076	0.0112	-0.0405
	(-1.79)*	(-2.17)**	(-1.85)*	(-2.37)**	(-1.05)	(-2.02)**	(-1.81)*	(0.12)	(-1.25)
$DEBT_{T-2}$	-0.0383	-0.0154	-0.0207	0.0029	-0.0286	-0.0743	-0.0309	2.8826	0.1583
	(-2.26)**	(-0.75)	(-1.40)	(0.17)	(-1.54)	(-4.26)**	(-1.74)*	(8.60)**	(1.36)
Constant	0.0988	0.0627	0.0875	0.0503	0.0647	0.0828	0.0789	4.5286	-0.0545
	(9.81)**	(5.22)**	(9.95)**	(4.81)**	(6.34)**	(7.31)**	(7.38)**	(22.56)**	(-0.75)
N. of obs.	265	254	265	254	216	239	226	248	244
R^2	0.41	0.39	0.36	0.36	0.47	0.55	0.44	0.68	0.11

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after; DEF_{T-2} **=** government deficit-to-GDP ratio at time T-2; $DEBT_{T-2}$ **=** public debt-to-GDP ratio at time T-2. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

In Part II, the magnitude of the change of financial variables around periods of fiscal contractions and expansions depends on the value of DEF_{T-2} or $DEBT_{T-2}$. For exemplification purpose, consider the values in column (1), and assume that a fiscal consolidation happens in a country with DEF_{T-2} equal to its average value in the sample of fiscal contractions at T-2 (i.e.: 4.7 per cent). INT10Y decreases, on average in each period, by 32 basis points (i.e.: -0.0002 + (-0.0634)*(0.047) = -0.0032)

Table 4: The composition of fiscal contractions

PART I	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0029	-0.0019	-0.0023	-0.0012	0.0005	-0.0036	-0.0015	0.1146	0.0124
	(-2.17)**	(-1.13)	(-2.05)**	(-0.83)	(0.33)	(-2.07)**	(-1.03)	(3.25)**	(1.38)
ΔPREXP	0.1001	0.1281	0.0144	0.0597	0.1822	0.1933	0.1628	-7.9723	-2.7765
	(0.90)	(0.92)	(0.16)	(0.52)	(1.32)	(1.19)	(1.25)	(-2.59)**	(-3.29)**
N. of obs.	304	285	304	285	255	266	245	287	283
R^2	0.33	0.35	0.31	0.36	0.43	0.39	0.34	0.45	0.14
FISCAL	-0.0029	-0.0019	-0.0023	-0.0012	0.0005	-0.0036	-0.0015	0.1158	0.0120
	(-2.17)**	(-1.16)	(-2.05)**	(-0.85)	(0.34)	(-2.14)**	(-1.00)	(3.30)**	(1.32)
Δ(TRANSF+CGW)	0.5535	0.7561	0.3525	0.5669	0.6540	1.0072	0.4231	-16.8982	-2.6029
	(2.94)**	(3.35)**	(2.21)**	(2.88)**	(3.20)**	(4.25)**	(1.96)**	(-3.51)**	(-1.98)**
N. of obs.	304	285	304	285	255	266	245	287	283
R^2	0.35	0.38	0.33	0.37	0.45	0.42	0.35	0.46	0.11
PART II	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0033	-0.0024	-0.0025	-0.0015	-0.0002	-0.0041	-0.0015	0.1128	0.0084
	(-2.40)**	(-1.44)	(-2.27)**	(-1.10)	(-0.12)	(-2.35)**	(-1.05)	(3.21)**	(0.91)
EXPLOW1	0.0033	0.0110	0.0025	0.0093	0.0032	0.0069	0.0049	0.2200	0.0014
	(0.79)	(2.24)**	(0.71)	(2.20)**	(0.67)	(1.22)	(1.21)	(1.86)*	(0.05)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.34	0.37	0.33	0.38	0.44	0.40	0.34	0.45	0.08
FISCAL	-0.0033	-0.0025	-0.0026	-0.0017	-0.0003	-0.0041	-0.0015	0.1120	0.0084
	(-2.56)**	(-1.59)	(-2.41)**	(-1.24)	(-0.18)	(-2.38)**	(-1.00)	(3.19)**	(0.91)
EXPLOW2	-0.0248	-0.0295	-0.0197	-0.0242	-0.0326	-0.0282	-0.0141	0.3472	-0.0026
	(-6.06)**	(-5.43)**	(-6.03)**	(-5.39)**	(-6.56)**	(-4.91)**	(-3.25)**	(2.80)**	(-0.09)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.41	0.43	0.40	0.44	0.53	0.45	0.36	0.46	0.08
PART III	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL*EXPLOW1	-0.0039	-0.0032	-0.0029	-0.0024	-0.0004	-0.0039	-0.0007	0.1138	0.0040
	(-2.07)**	(-1.40)	(-1.81)*	(-1.20)	(-0.19)	(-1.67)*	(-0.31)	(2.26)**	(0.31)
FISCAL*EXPHIGH1	-0.0026	-0.0015	-0.0022	-0.0007	0.0001	-0.0044	-0.0022	0.1117	0.0131
	(-1.36)	(-0.64)	(-1.40)	(-0.36)	(0.03)	(-1.64)*	(-1.12)	(2.28)**	(0.98)
EXPLOW1	0.0070	0.0162	0.0043	0.0143	0.0046	0.0055	0.0002	0.2136	0.0290
	(0.79)	(1.50)	(0.59)	(1.57)	(0.45)	(0.47)	(0.02)	(0.87)	(0.49)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.34	0.38	0.33	0.38	0.44	0.40	0.34	0.45	0.08
FISCAL*EXPLOW2	-0.0055	-0.0041	-0.0048	-0.0033	-0.0006	-0.0052	-0.0036	0.1324	0.0245
	(-2.54)**	(-1.42)	(-2.66)**	(-1.37)	(-0.23)	(-2.18)**	(-1.62)	(2.15)**	(1.76)*
FISCAL*EXPHIGH2	-0.0019	-0.0016	-0.0012	-0.0007	-0.0001	-0.0033	-0.0002	0.0989	-0.0017
	(-1.19)	(-0.85)	(-0.91)	(-0.42)	(-0.04)	(-1.36)	(-0.13)	(2.35)**	(-0.13)
EXPLOW2	-0.0138	-0.0221	-0.0090	-0.0162	-0.0310	-0.0227	-0.0040	0.2463	-0.0810
	(-1.53)	(-1.91)*	(-1.21)	(-1.69)*	(-2.98)**	(-1.96)**	(-0.42)	(0.97)	(-1.29)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.42	0.44	0.40	0.44	0.53	0.45	0.36	0.46	0.08

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after; ΔPREXP = change of the cyclically adjusted primary expenditure to GDP; Δ(TRANSF+CGW) = change of the ratio of cyclically adjusted transfers and government wage payments to GDP; EXPLOW1 = 1 if the decrease (increase) of the cyclically adjusted primary expenditure to GDP ratio is larger (smaller) than the median change in the sample of fiscal contractions (fiscal expansions) and zero otherwise; EXPHIGH1 = 1-EXPLOW1; EXPLOW2 = 1 if the decrease (increase) of the ratio of cyclically adjusted transfers and government wage payments to GDP is larger (smaller) than the median change in the sample of fiscal contractions (fiscal expansions) and zero otherwise; EXPHIGH2 = 1-EXPLOW2. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Table 5: Macroeconomic conditions around periods of fiscal contractions

	INT10Y	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0034	-0.0028	-0.0026	-0.0018	-0.0009	-0.0044	-0.0020	0.1080	0.0093
	(-3.27)**	(-2.01)**	(-2.75)**	(-1.42)	(-0.72)	(-3.06)**	(-1.69)*	(3.84)**	(1.02)
$GROWTH_{T-2}$	0.0370	0.2100	-0.0180	0.1562	0.2678	0.2000	0.3009	1.1465	-0.6260
	(0.52)	(2.21)**	(-0.27)	(1.75)*	(3.28)**	(1.79)*	(4.55)**	(0.55)	(-0.99)
$INFL_{T-2}$	0.4283	0.4422	0.2809	0.2869	0.5171	0.4523	0.4081	-10.6396	0.1361
	(11.57)**	(8.71)**	(8.21)**	(6.23)**	(11.53)**	(8.41)**	(10.68)**	(-13.76)**	(0.53)
Δ GROWTH	-0.0461	-0.1563	-0.0417	-0.1712	0.0044	-0.1887	-0.0766	0.6411	1.5639
	(-0.74)	(-1.96)**	(-0.69)	(-2.35)**	(0.06)	(-1.79)*	(-1.09)	(0.47)	(2.42)**
Δ INFL	-0.0466	0.0092	-0.0837	-0.0972	0.0463	0.0454	-0.0895	0.6305	1.0412
	(-0.55)	(0.08)	(-1.05)	(-0.89)	(0.48)	(0.35)	(-1.10)	(0.39)	(1.81)*
Constant	0.0971	0.0819	0.0896	0.0740	0.0771	0.0910	0.0832	5.2854	0.0612
	(14.03)**	(8.99)**	(12.55)**	(8.64)**	(8.55)**	(7.54)**	(12.48)**	(39.62)**	(1.02)
N. of obs.	306	287	306	287	257	268	245	289	285
R^2	0.64	0.61	0.53	0.52	0.69	0.62	0.64	0.67	0.11

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after; $GROWTH_{T-2}$ = real GDP growth rate at T-2; $INFL_{T-2}$ = inflation rate at time T-2; ΔGROWTH = change in real GDP growth rate; ΔINFL = change in inflation rate. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Table 6: Monetary policy and fiscal contractions

	INT10Y	**RINT10Y**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)
FISCAL	-0.0028	-0.0020	-0.0039	-0.0016	0.0945	0.0191
	(-2.59)**	(-2.19)**	(-2.59)**	(-1.29)	(2.57)**	(1.71)*
$DISCR_{T-2}$	0.8041	0.6724	0.9406	0.8048	-6.9977	0.2811
	(17.34)**	(16.89)**	(14.31)**	(12.46)**	(-3.79)**	(0.42)
ΔDISCR	0.1493	0.0823	0.3122	0.1276	-1.7963	-0.2874
	(2.58)**	(1.78)*	(3.77)**	(1.16)	(-0.84)	(-0.35)
Constant	0.0426	0.0370	0.0283	0.0388	5.4008	-0.0124
	(6.64)**	(5.98)**	(2.62)**	(4.94)**	(22.94)**	(-0.15)
N. of obs.	257	257	219	205	240	236
R^2	0.69	0.68	0.68	0.64	0.51	0.09
FISCAL	-0.0036	-0.0028	-0.0046	-0.0026	0.1104	0.0084
	(-3.70)**	(-3.32)**	(-3.53)**	(-2.23)**	(3.19)**	(0.88)
$INT3M_{T-2}$	0.6738	0.5535	0.7718	0.6989	-9.0950	0.5188
	(17.66)**	(17.20)**	(14.68)**	(10.09)**	(-6.68)**	(1.10)
ΔINT3M	0.2546	0.1791	0.6227	0.3231	-2.0619	-1.0638
	(3.77)**	(3.17)**	(5.98)**	(3.68)**	(-0.93)	(-1.22)
Constant	0.0642	0.0566	0.0533	0.0577	5.4925	0.0072
	(10.87)**	(10.14)**	(5.05)**	(6.75)**	(28.98)**	(0.11)
N. of obs.	278	278	243	225	261	257
R^2	0.70	0.69	0.73	0.62	0.53	0.09

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after. See section 2.2 for the definition of fiscal contractions and fiscal expansions and section 3.5 for variables definitions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Table 7: The policy-mix around periods of fiscal contractions

	INT10Y	INT3M	RINT10Y	RINT3M	DISCR	LIBOR	CORP	MSCI	MSCIGR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0028	-0.0017	-0.0016	-0.0004	-0.0012	-0.0049	-0.0016	0.1059	0.0236
	(-2.47)**	(-1.17)	(-1.61)	(-0.31)	(-0.88)	(-2.98)**	(-1.36)	(3.73)**	(2.08)**
$EXCHGR_{T-2}$	0.0236	0.0804	0.0834	0.1450	0.1661	-0.0321	0.0869	6.2845	0.2422
	(0.46)	(1.11)	(1.82)*	(2.25)**	(2.42)**	(-0.42)	(1.58)	(5.24)**	(0.47)
$INT.INTEGR._{T-2}$	0.0185	0.0156	0.0096	0.0070	0.0208	0.0335	0.0250	-0.6006	0.0013
	(4.60)**	(3.63)**	(2.50)**	(1.75)*	(5.08)**	(5.38)**	(5.25)**	(-11.19)**	(0.04)
$FIN.LIB_{T-2}$	-0.0632	-0.2119	-0.0858	-0.2207	-0.1464	-0.1370	0.0541	-4.3828	-0.6238
	(-1.02)	(-2.51)**	(-1.56)	(-2.76)**	(-2.16)**	(-1.62)	(0.96)	(-4.42)**	(-1.63)
ΔEXCHGR	-0.0070	0.0002	-0.0062	0.0098	-0.0268	0.0114	-0.0238	0.9509	0.8514
	(-0.30)	(0.001)	(-0.31)	(0.38)	(-0.89)	(0.31)	(-1.08)	(1.67)*	(3.74)**
Δ INT.INTEGR	-0.0078	-0.0092	-0.0099	-0.0105	-0.0061	-0.0105	-0.0134	-0.0953	0.0517
	(-0.83)	(-1.49)	(-1.13)	(-2.04)**	(-0.79)	(-1.08)	(-2.30)**	(-1.07)	(0.80)
ΔFIN.LIB	-0.0173	-0.1236	-0.0113	-0.0924	-0.0233	-0.1201	0.1167	-1.6348	0.4639
	(-0.27)	(-1.71)*	(-0.20)	(-1.35)	(-0.33)	(-1.98)**	(1.42)	(-1.50)	(0.67)
Constant	0.1620	0.2957	0.1750	0.2953	0.2389	0.2308	0.0442	9.6361	0.5898
	(2.69)**	(3.64)**	(3.28)**	(3.86)**	(3.63)**	(2.77)**	(0.80)	(9.81)**	(1.58)
N. of obs.	202	197	202	197	196	172	156	194	193
R^2	0.62	0.65	0.55	0.62	0.67	0.64	0.71	0.69	0.21

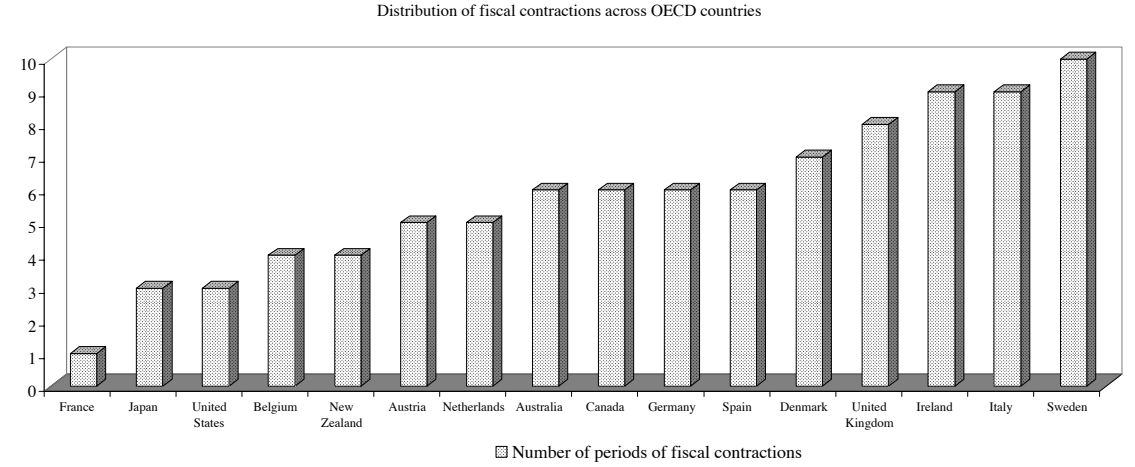
Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after; $EXCHGR_{T-2}$ = growth rate of the nominal effective exchange rate at T-2 (a minus sign indicates a nominal devaluation); $INT.INTEGR_{T-2}$ = index measuring extent of international integration of capital markets, on the current account and the existence of multiple exchange rates at time T-2; $.FIN.LIB_{T-2}$ = index measuring extent of financial liberalization at time T-2; ΔEXCHGR = change in EXCHGR; Δ INT.INTEGR = change in INT.INTEGR; ΔFIN.LIB = change in FIN.LIB. See section 2.2 for the definition of fiscal contractions and fiscal expansions and section 3.5 for variables definitions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

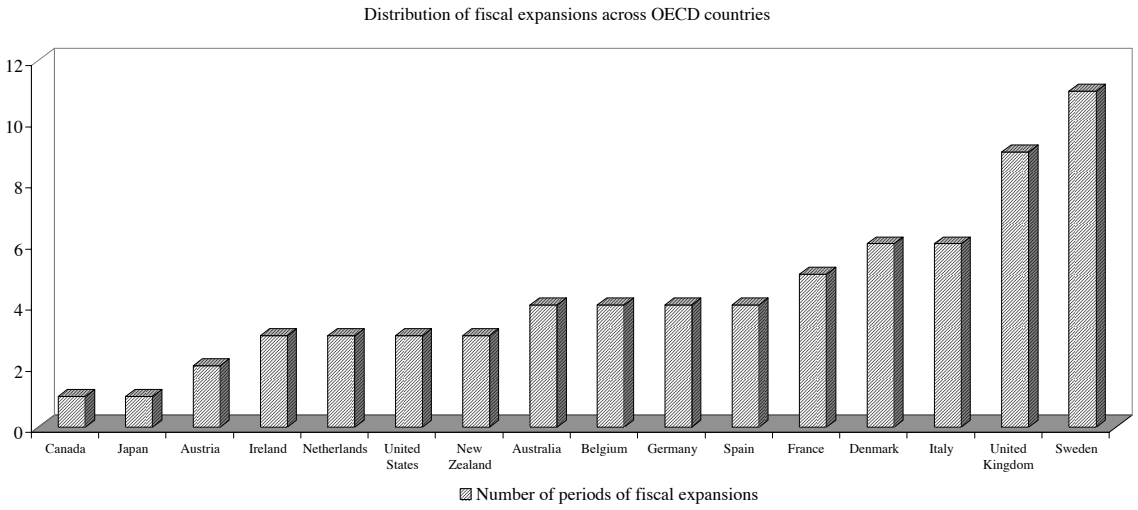
Table 8: Fiscal contractions and debt sustainability

PART I	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0040	-0.0023	-0.0032	-0.0014	0.0001	-0.0035	-0.0027	0.0227	0.0158
	(-2.93)**	(-1.44)	(-2.80)**	(-1.05)	(0.05)	(-2.04)**	(-1.76)*	(3.55)**	(1.72)*
ΔDEBT $_{T+2}$	0.1644	0.1588	0.1249	0.1166	0.0936	0.1548	0.0484	-1.0052	-0.4682
	(5.86)**	(4.52)**	(5.43)**	(3.92)**	(2.54)**	(3.98)**	(1.11)	(-5.84)**	(-1.87)*
N. of obs.	270	263	270	263	225	241	227	253	249
R^2	0.38	0.36	0.36	0.34	0.43	0.41	0.31	0.51	0.13
FISCAL	-0.0042	-0.0023	-0.0033	-0.0013	-0.0005	-0.0036	-0.0032	0.0268	0.0250
	(-3.24)**	(-1.41)	(-3.04)**	(-0.93)	(-0.31)	(-2.09)**	(-2.17)**	(4.70)**	(2.69)**
ΔDEBT $_{T+3}$	0.1546	0.1546	0.1166	0.1136	0.1183	0.1729	0.1086	-0.9939	-0.3147
	(8.83)**	(7.16)**	(7.74)**	(5.91)**	(4.94)**	(7.15)**	(3.70)**	(-8.82)**	(-1.69)*
N. of obs.	255	248	255	248	223	226	219	238	234
R^2	0.44	0.41	0.41	0.38	0.47	0.48	0.37	0.63	0.14
PART II	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL	-0.0040	-0.0023	-0.0032	-0.0014	0.0002	-0.0036	-0.0026	0.0230	0.0159
	(-2.84)**	(-1.39)	(-2.72)**	(1.03)	(0.15)	(-2.01)**	(-1.74)*	(3.49)**	(1.74)*
DEBTLOW1	-0.0155	-0.0173	-0.0101	-0.0119	-0.0067	-0.0156	0.0009	0.1239	0.0177
	(-2.91)**	(-2.44)**	(-2.27)**	(-1.95)*	(-0.95)	(-1.64)*	(0.16)	(5.13)**	(0.49)
N. of obs.	270	263	270	263	225	241	227	253	249
R^2	0.31	0.32	0.29	0.31	0.41	0.37	0.31	0.48	0.11
FISCAL	-0.0042	-0.0023	-0.0033	-0.0013	-0.0003	-0.0035	-0.0032	0.0268	0.0249
	(-3.16)**	(-1.42)	(-2.98)**	(-0.94)	(-0.21)	(-2.07)**	(-2.15)**	(4.53)**	(2.69)**
DEBTLOW2	-0.0300	-0.0298	-0.0207	-0.0199	-0.0278	-0.0460	-0.0218	0.1842	0.0339
	(-6.01)**	(-4.86)**	(-4.92)**	(-3.72)**	(-3.84)**	(-6.20)**	(-3.54)**	(8.93)**	(0.94)
N. of obs.	255	248	255	248	223	226	219	238	234
R^2	0.39	0.36	0.35	0.34	0.46	0.48	0.36	0.59	0.13
PART III	**INT10Y**	**INT3M**	**RINT10Y**	**RINT3M**	**DISCR**	**LIBOR**	**CORP**	**MSCI**	**MSCIGR**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FISCAL*DEBTLOW1	-0.0062	-0.0020	-0.0054	-0.0019	0.0009	-0.0033	-0.0040	0.0282	-0.0124
	(-2.47)**	(-0.61)	(-2.55)**	(-0.67)	(0.30)	(-1.15)	(-1.26)	(2.64)**	(-0.99)
FISCAL*DEBTHIGH1	-0.0027	-0.0024	-0.0019	-0.0012	-0.0000	-0.0038	-0.0021	0.0199	0.0333
	(-1.62)	(-1.31)	(-1.40)	(-0.77)	(-0.02)	(-1.66)*	(-1.21)	(2.37)**	(2.75)**
DEBTLOW1	-0.0049	-0.0188	0.0004	-0.0097	-0.0093	-0.0170	0.0067	0.0990	0.1549
	(-0.46)	(-1.45)	(0.05)	(-0.88)	(-0.78)	(-1.19)	(0.53)	(2.01)**	(2.62)**
N. of obs.	270	263	270	263	225	241	227	253	249
R^2	0.31	0.32	0.30	0.31	0.41	0.37	0.31	0.48	0.14
FISCAL*DEBTLOW2	-0.0085	-0.0046	-0.0076	-0.0043	-0.0015	-0.0047	-0.0061	0.0342	0.0086
	(-3.38)**	(-1.43)	(-3.56)**	(-1.50)	(-0.50)	(-1.49)	(-2.24)**	(3.54)**	(0.65)
FISCAL*DEBTHIGH2	-0.0020	-0.0011	-0.0012	0.0002	0.0001	-0.0028	-0.0019	0.0227	0.0339
	(-1.34)	(-0.60)	(-0.93)	(0.16)	(0.07)	(-1.45)	(-1.11)	(3.04)**	(2.79)**
DEBTLOW2	-0.0108	-0.0194	-0.0016	-0.0063	-0.0231	-0.0404	-0.0092	0.1495	0.1098
	(-1.12)	(-1.61)	(-0.19)	(-0.60)	(-2.03)**	(-3.40)**	(-0.86)	(3.56)**	(1.78)*
N. of obs.	255	248	255	248	223	226	219	238	234
R^2	0.40	0.37	0.37	0.34	0.46	0.48	0.37	0.59	0.14

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate; FISCAL = 1 two years before a fiscal contraction or expansion, 2 one year before, 3 at the time of the fiscal contraction or expansion, 4 one year after, and 5 two years after; $\Delta DEBT_{T+2}$ = change of the public debt-to-GDP ratio from the last year of the fiscal contraction or fiscal expansion to two years after; $\Delta DEBT_{T+3}$ = change of the public debt-to-GDP ratio from the last year of the fiscal contraction or fiscal expansion to three years after; DEBTLOW1 = 1 if, two years after the last year of the fiscal contraction (fiscal expansion), the ratio of public debt-to-GDP has declined (increased) more (less) than 3 percentage points and zero otherwise; DEBTHIGH1 = 1-DEBTLOW1; DEBTLOW2 = 1 if, three years after the last year of the fiscal contraction (fiscal expansion), the ratio of public debt-to-GDP has declined (increased) more (less) than 5 percentage points and zero otherwise; DEBTHIGH2 = 1-DEBTLOW2. See section 2.2 for the definition of fiscal contractions and fiscal expansions. Columns 1 – 9 estimated by OLS and standard errors are corrected for heteroskedasticity. T-statistics in parenthesis.

Figure 1: Periods of fiscal contractions and fiscal expansions in OECD countries from 1960 to 2002





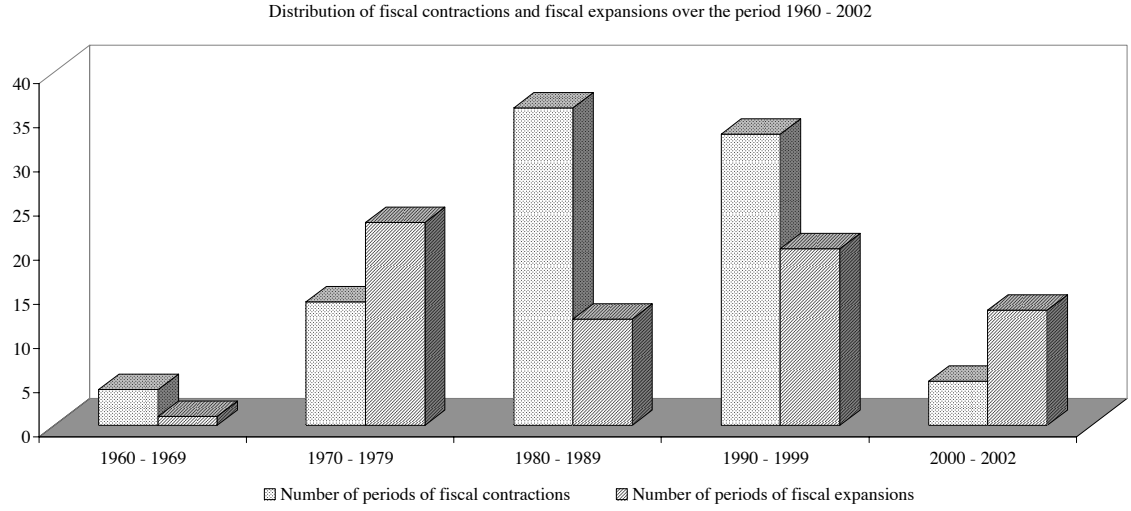
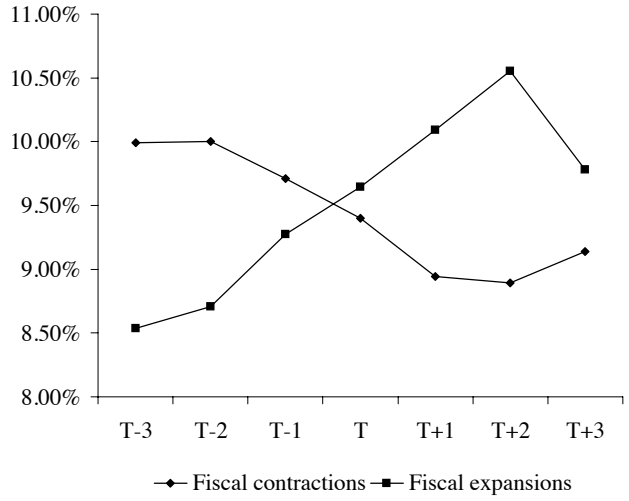
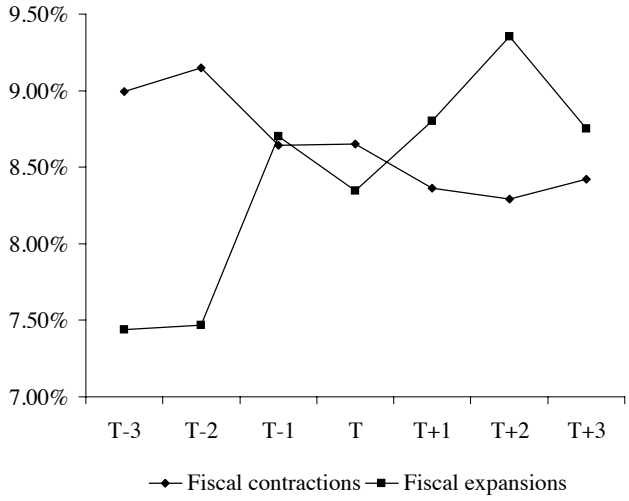


Figure 2: Interest rates

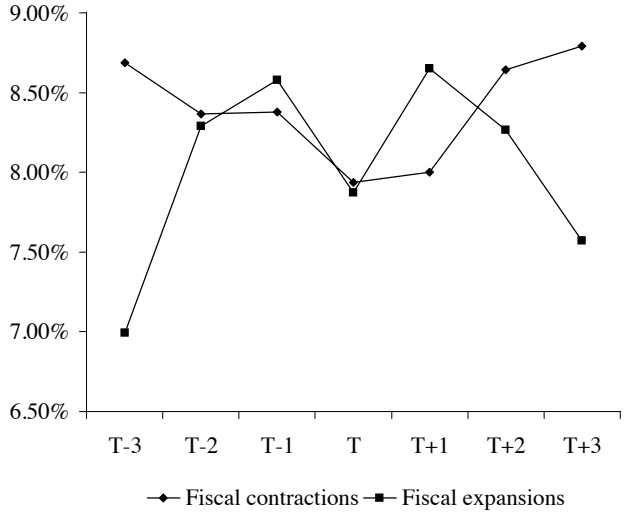
10-year government bonds nominal interest rate



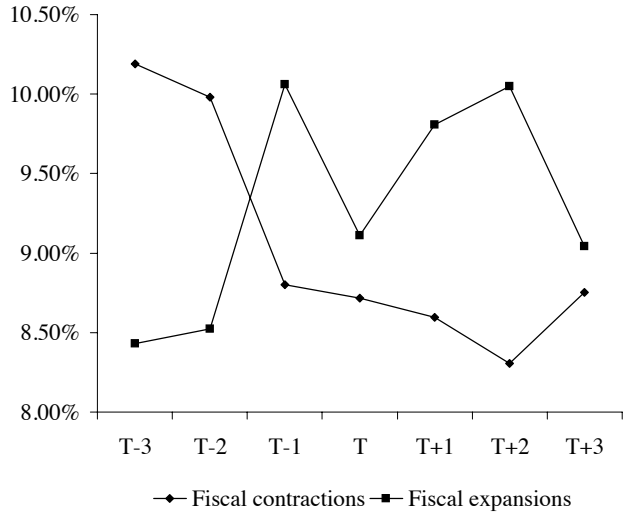
3-month government bonds nominal interest rate



Discount rate



Libor



Corporate bonds interest rate

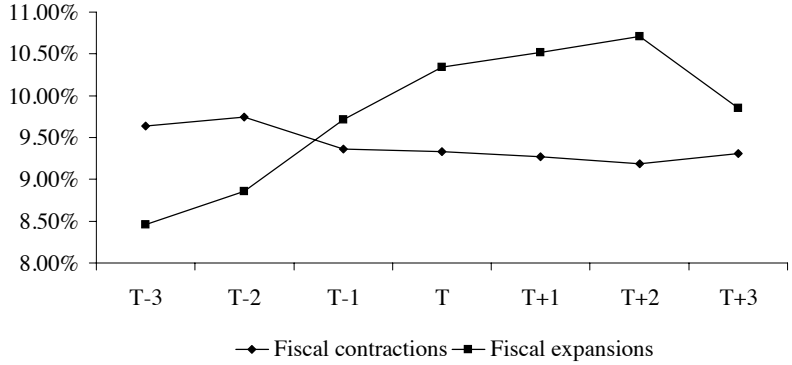
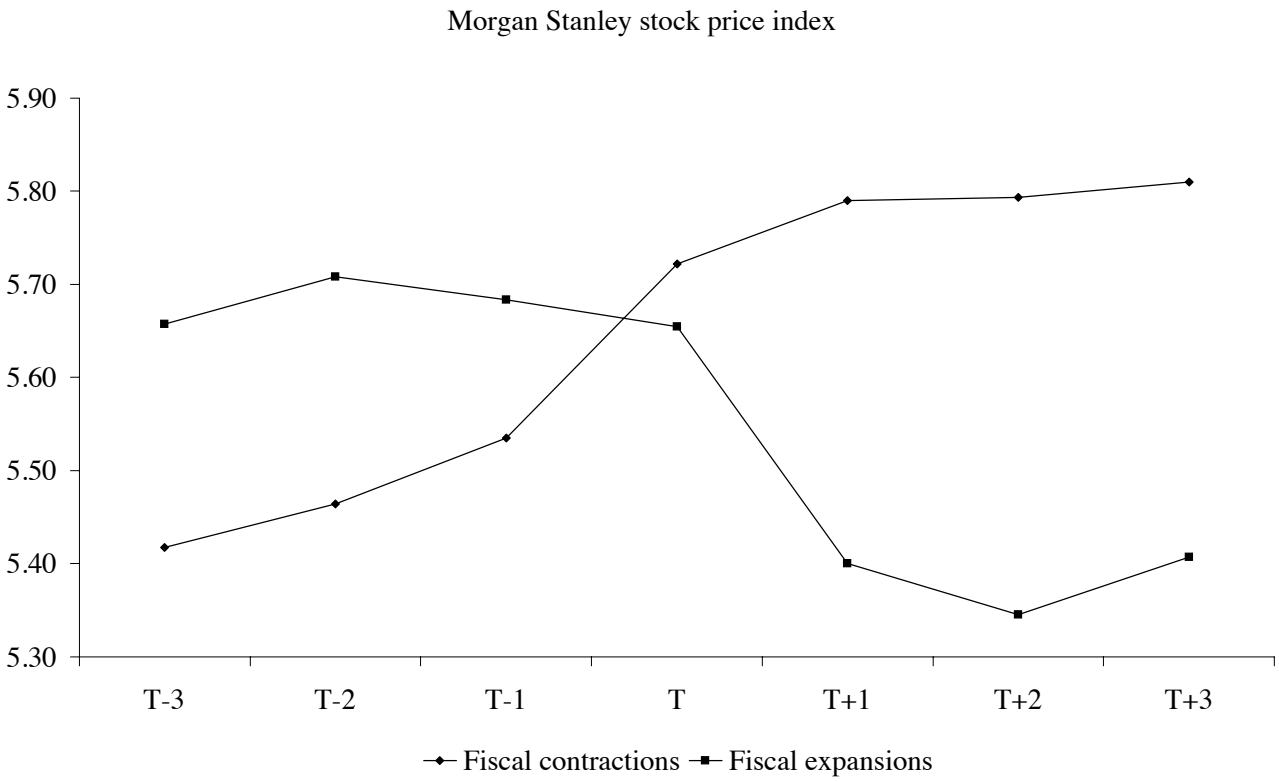
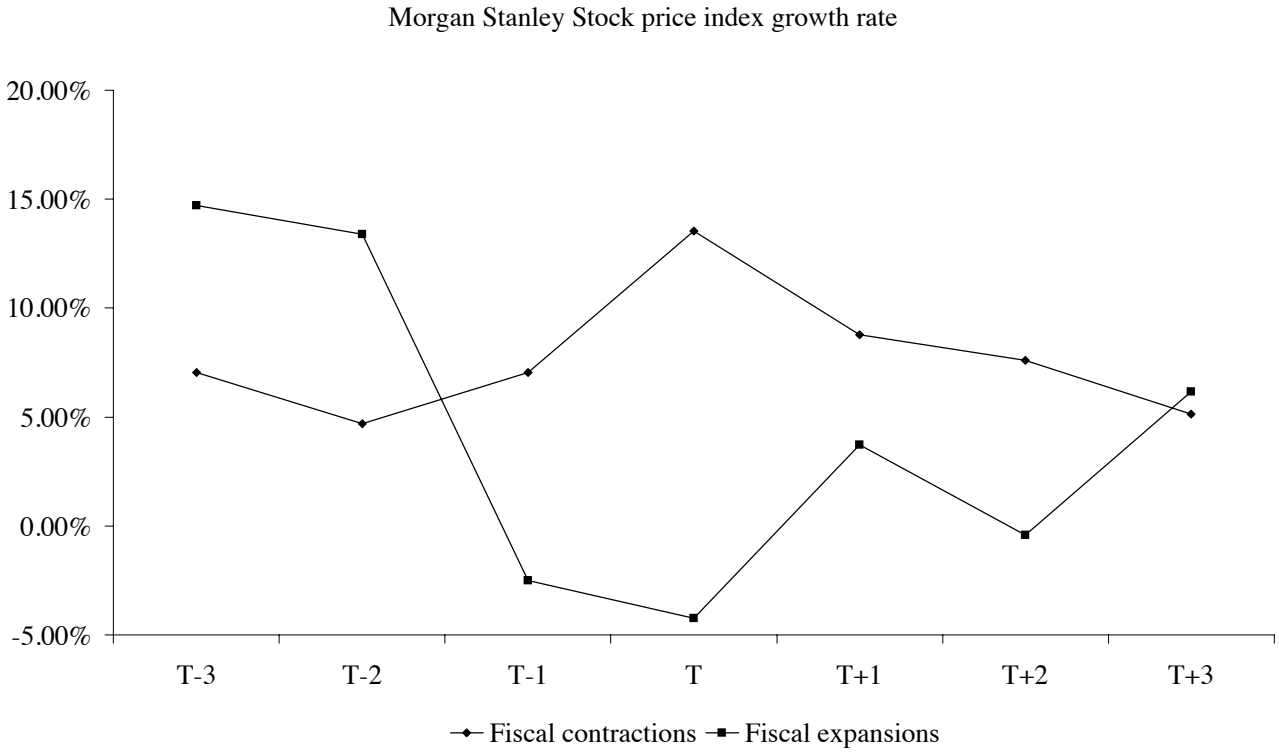


Figure 3: Stock market prices





Appendix

Summary statistics

	Episodes of Fiscal Contractions				
	T-2	T-1	T	T+1	T+2
INT10Y	0.10	0.097	0.094	0.089	0.089
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
INT3M	0.091	0.086	0.087	0.084	0.083
	(0.07)	(0.006)	(0.005)	(0.006)	(0.006)
RINT10Y	0.085	0.083	0.082	0.077	0.077
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
RINT3M	0.077	0.073	0.074	0.0073	0.071
	(0.006)	(0.005)	(0.004)	(0.005)	(0.005)
DISCR	0.084	0.084	0.079	0.080	0.086
	(0.006)	(0.007)	(0.004)	(0.007)	(0.007)
LIBOR	0.10	0.088	0.087	0.086	0.083
	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)
CORP	0.097	0.094	0.093	0.093	0.092
	(0.006)	(0.005)	(0.004)	(0.005)	(0.006)
MSCI	5.46	5.535	5.722	5.79	5.793
	(0.145)	(0.143)	(0.105)	(0.139)	(0.146)
MSCIGR	0.047	0.070	0.135	0.088	0.076
	(0.025)	(0.030)	(0.022)	(0.028)	(0.032)
	Episodes of Fiscal Expansions				
	T-2	T-1	T	T+1	T+2
INT10Y	0.087	0.093	0.096	0.101	0.106
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
INT3M	0.075	0.087	0.083	0.088	0.094
	(0.006)	(0.007)	(0.006)	(0.007)	(0.007)
RINT10Y	0.072	0.077	0.081	0.083	0.088
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
RINT3M	0.058	0.069	0.069	0.070	0.076
	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)
DISCR	0.083	0.086	0.079	0.086	0.083
	(0.008)	(0.007)	(0.006)	(0.008)	(0.006)
LIBOR	0.085	0.101	0.091	0.098	0.100
	(0.007)	(0.008)	(0.006)	(0.010)	(0.008)
CORP	0.089	0.097	0.103	0.105	0.107
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)
MSCI	5.708	5.683	5.655	5.40	5.345
	(0.186)	(0.185)	(0.137)	(0.197)	(0.199)
MSCIGR	0.134	-0.025	-0.042	0.037	-0.004
	(0.035)	(0.032)	(0.023)	(0.038)	(0.031)

Notes: INT10Y = nominal interest rate of 10-year government bonds; INT3M = nominal interest rate on 3-month Treasury bills; RINT10Y = real interest rate of 10-year government bonds; RINT3M = real interest rate on 3-month Treasury bills; DISCR = discount rate; LIBOR = LIBOR interest rate; CORP = average corporate bonds interest rate; MSCI = Morgan Stanley MSCI share price index (expressed in US $ and in logs); MSCIGR = Morgan Stanley MSCI share price index (expressed in US $) growth rate. Standard deviation of the means in parenthesis.

HARVARD UNIVERSITY
DEPARTMENT OF ECONOMICS

SILVIA ARDAGNA
ASSISTANT PROFESSOR

M-29 LITTAUER CENTER
TELEPHONE: 617-495 8823
FAX: 617-495 7730
sardagna@fas.harvard.edu

CAMBRIDGE, MASSACHUSETTS 02138-3001

Dear Juergen,

Please find attached the revised version of the paper "Financial Markets' Behavior around Episodes of Large Changes in the Fiscal Stance (Ms. No. EER-D-05-0050)" and a memo in which I summarize the changes I made in revising the paper.

I followed closely the suggestions you and the referees provided, for which I am very grateful. I hope the new version of the paper well addresses the concerns raised and the paper is now suitable for the European Economic Review.

I thank you very much for giving me the opportunity to revise my work for the EER. Please do not hesitate to contact me if you need further information.

Best regards,

Silvia Ardagna

Revised version of the paper "Financial Markets' Behavior around Episodes of Large Changes in the Fiscal Stance" by Silvia Ardagna.

Following the Editor' and the Referees' suggestions:

1) I avoided interpreting the results of the paper in light of a particular model.

2) I acknowledged and discussed a potential endogeneity problem relatively to the selection of episodes of fiscal adjustments and expansions and to the role of the macroeconomic conditions (see pages 5-6).

Following the Editor's suggestions:

3) I included a subsection (section 3.3) in which I related the results of the paper to relevant theory.

4) I corrected the references and the use of "we" and "I".

5) I pointed out that von Hagen, Hallet and Strauch (2002), von Hagen and Strauch (2001) investigate the role of the macroeconomic and monetary conditions for the success of fiscal consolidations (see page 6).

Following Referee # 1's suggestions:

6) I estimated equation (2) by including output gaps instead of the growth rate of real GDP among the regressors (see pages 18-19).

7) I estimated equation (2) by including M2 among the regressors to control for the stance of monetary policy (see page 19).

Following Referee # 2's suggestions:

8) I extended the discussion about the use of yearly rather than high frequency data (see pages 4-5).

9) I corrected the discussion of the descriptive evidence in Figure 2 (see pages 7-8).

10) I eliminated the comment on the second paragraph of page 12 of the original version of the paper and the concluding sentence on page 15, section 4.1, of the original version of the paper.

11) I did not delete section 2.3 because I find that a first look at the data is informative. If the Referee feels strongly against section 2.3, I am happy to reconsider my choice.